PUBLICATIONS OF
THE TRAINING SCHOOL AT VINELAND NEW JERSEY
DEPARTMENT OF RESEARCH

A CONTRIBUTION TO THE STANDARDIZATION OF THE DE SANCTIS TESTS

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REPRINT FROM THE TRAINING SCHOOL BULLETIN
JUNE 1916

NO. 14—SEPTEMBER 1916

A Contribution to the Standardization of the De Sanctis Tests

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A graded series of six tests was proposed by Professor Sante De Sanctis, of the University of Rome, in an article, "Types and Degrees of Mental Deficiency," which appeared in Italian in Annali di Nevrologia, Naples, 1906, and in French in L'Année Psychologique, No. 12, of the same year. A translation of these tests was published in the Training School Bulletin two years later.

At the end of an article, "Mental Development and Measurement of Intelligence," which appeared in the Journal of Educational Psychology November, 1911, Professor De Sanctis explains: "At the present time in certain American, Russian and Italian institutions, my series of tests of 1905 are in general use. These tests, however, are not designed primarily to measure the level of intelligence. Rather I intended them to measure the degree of mental defect. (This was after stating that it was yet to be proven 'that the laws of intellectual regression and involution are the same as those of progression and evolution.')

"By the application of my tests in an institution for idiots or in a special school for abnormal children one can easily and with a high degree of certainty obtain a division of all of the inmates into three groups, mental defectives of the third, second and first grades. Thus, those who are called idiots and imbeciles, defectives of the third and second grades, are quickly distinguished from those who are to-day called 'morons,' defectives of the first grade. This is important from the medico-pedagogical standpoint, since the morons should be sent to special schools, or as day pupils to asylum schools, while the idiots and imbeciles should be entrusted to institutions."

Prof. De Sanctis claims that by these tests one discovers directly:

First—Capacity of adaptation to experience, which comprises adaptation to work, and certain conditions of attention, of perception and of will.

Second—Immediate memory of colors.

Third—Capacity for recognizing colors and forms, and the recognition in a way to establish the identity of a plane figure with a solid.

Fourth—The tenacity or duration of attention.

Fifth—The capacity of enumerating objects and of judging of their quantity, size and distance.

Sixth—The capacity to reason about objects no longer present to the senses, and on the general concepts which comprise not only attention and imagination, but also the faculty of generalization and abstraction.

Seventh—The rapidity of perceiving, of reflecting and of acting.

The progressive difficulty in these tests, according to their author, consists in starting from experiments on intellectual functions, which he calls inferior, and proceeding to the superior functions. This method seems to him more reasonable than that which consists of tests of increasing difficulty along the line of memory or of attention.

Between October, 1914, and April, 1915, the De Sanctis tests were given to 362 children—212 public school children from the first four grades of three Vineland schools (including a few three and four year old children, who were tested in their own homes), and to 150 inmates of the Training School.

It is the purpose of the present study to see how children, both normal and feeble-minded, react to these tests; to see whether those of the same level of intelligence make the same character of response.

In this report mental age as determined by the Binet scale is the basis of comparison. The mental ages of the children from the Training School were taken from the laboratory records. The public school children were given the Binet tests after being given the De Sanctis series. This precaution was taken because of the influence that the tests with the weighted cubes might have upon the subject's reaction to the De Sanctis questions, "Are large things heavier or lighter than small things?" and "How does it happen that sometimes small things are heavier than large things?" Chronological age is counted from the last birthday, mental age from the last full year of the final rating.

The De Sanctis series was always given by the same examiner. Twelve was the average number tested per day when both series of tests were given.

Two of the public schools were selected because they had few children of foreign parentage. From the third school, where a large proportion of the attendance is Italian, not many pupils were tested. Six were taken from the first grade, forty-five from the third and fourth grades. The age distribution can be seen from Table III.

The records of five children were not used in this study because by the Binet tests they are feeble-minded. They are appended here for the benefit of any readers who may wish to use the unselected group.

The testing in the public schools was conducted during school hours and in unused cloak rooms or halls adjoining the rooms from which the children were taken. Although the conditions were not ideal, the light was always good, and in all cases there was plenty of room. A disturbing element was the school hum, but the subjects did not seem to be distracted

by these ordinary school noises, and the examiner felt that they in no case affected the success or the failure of the individual tests, yet they may have influenced the rapidity of the individual responses. The attitude of the children was all that could be desired; each was interested and each wanted to try "the game."

The "children" from the Training School were an unselected group and ranged in age from 3 to 50 years. The age distribution was as follows:

5	were between	3	and	7	years of age
91	were between	7	and	16	years of age
31	were between	16	and	20	years of age
14	were between	20	and	30	years of age
6	were between	30	and	40	years of age
3	were between	40	and	50	years of age
Total.... 150					

All the children in the school department served as subjects, the tests being conducted in an unused room in the school building. The other feeble-minded children were tested in quiet rooms in the cottages in which they live.

The method followed is as outlined in Dr. Goddard's translation of the De Sanctis Tests (published in the Training School BULLETIN in 1908 and reprinted in the May edition, 1913) with four modifications, each of which appear in the author's description of the tests as published in 1906.

1. A pause of 40" was introduced between the first and second test.
2. The fourth test was separated into two parts.
3. In the third part of the sixth test the position of the words "larger" and "smaller" was interchanged.
4. In the fourth part of the sixth test the word "really" was inserted.

The material used was such as sold for this series of tests by C. H. Stoelting & Co., Chicago.

The subject was always seated at a table opposite the examiner. At the beginning of the test the material was on the table; those portions needed for the separate tests being by themselves and covered with pasteboard boxes (3) of convenient sizes. The material was exposed to view only while the test which required it was being performed. There was a rest interval after each test. The questions may be repeated three times.

TEST 1.

Material—Five wooden balls of different colors, red, green, blue, orange and yellow. These balls were 5cm. in diameter.

The examiner says to the subject, "Give me a ball."

The balls were presented in a row, but not in a definite arrangement as to color. There was no record kept of the cases in which the ball chosen was the one nearest the favored hand.

Of the public school children 26 per cent. gave the blue ball, 25 per cent. the red, 18 per cent. the green, 16 per cent. the orange, and 14 per cent. the yellow. Of the feeble-minded subjects, 34 per cent. gave the red ball, 24 per cent. the blue, 18 per cent. the yellow, 12 per cent. the green, and 11 per cent. the orange. The red and the blue led, one or the other being chosen in over 50 per cent. of the cases in each group.

All of the children of 3-year mentality succeeded in this test. In the feeble-minded group, 77 per cent. of those of mentality of 2 years succeeded; there was no corresponding group of normal children. See Tables I and II.

TEST 2.

Material—Same as Test 1.

There was an interval of 40" between the first and second tests during which time the balls were not exposed to view. The arrangement of the balls was changed before they were again presented.

The examiner asks, "Which is the ball you gave me?"

Eighty-eight per cent. of the normal children of a mental age of 4 years succeeded in passing the test; the 5-year group among the feeble-minded did nearly as well. In each group less than 30 per cent. of the children of 3-year mentality passed the test. See tables.

TEST 3.

Material—Ten wooden geometric forms of the same color. Five cubes (3.5cm.). Three four-sided pyramids (5cm. high). Two parallelopipeds (6x3x1.5cm.).

The five wooden cubes were well scattered among the other forms on the table. The examiner holds up a sixth cube of the same size and color (a cube from material for test five) and says to the subject, "Do you see this?" "Show me all that are like it in that group."

Only 2 of the 7 normal children of a mentality of 3 years passed this test; one of these required a second trial. Of the 8 normal children of a mental age of 4 years, only one failed the test; in all three trials this subject picked out the cubes first then picked out the other forms.

Although the numbers are small, the failures and successes were so decided, it seems that this test of ability to recognize form might be a good 4-year test.

Mental Age	Normal		Feeble-minded	
	Cases	% Passed	Cases	% Passed
4	8	89	13	77
3	7	29	6	33

Four of the 13 Training School children who have mental ages between 2 and 3 years succeeded in this test. It was interesting to see that these were all cases of children who go to kindergarten every day. Their chronological ages were 3.5, 9.9, 10.1 and 11.1, and their reaction times were 23″, 17″, 26″ and 15″ respectively. The character of the failures—no response, tried to put blocks in their mouths, gathered blocks together to play, picked them up at random, or picked out the cubes then all the others.

Of the 6 feeble-minded children with a mental age of 3 years, only two succeeded in the test, taking 25″ and 20″ for the response. But all of this group seemed to understand part of the request. Of the demand, "Show me all that are like this," they had seemingly gotten only the first part, "Show me all." Some selected the cubes first and then the other blocks, others picked up all the pieces at random one by one.

A few of the children of 8-year mentality and many of those beyond that age seemed to resent the test. This was particularly true of the feeble-minded children. They considered it too easy. As one girl, with a shrug expressed it, "Ah, this is kindergarten." Others of the older children seemed to suspect a trick in the test. They would study the blocks carefully to see if there might be a very slight difference in size or in shape—and would not pick out the blocks that showed wear until the test was re-explained. Before responding they would often look at the examiner as if wondering why such an easy request had been made of them, or would go at the task in a half-hearted way. A few hesitated as if on the point of refusal.

There is nothing in the demand to stimulate the subject to act quickly. If test 5 were given before test 3, the reaction time would be lowered in many cases—the time which is emphasized in that test often carries over to the following one. Except for individual cases and for the lower years, it would seem as if the time element were of little value.

TEST 4.

Material—A card of geometric forms, a small wooden pointer, and a black wooden cube with a face the size of the squares on the card. This card is about 32cm. square and has on it 10 rows of 14 figures each. The figures are triangles, rectangles and squares reproduced in solid black. There are 49 squares placed at random on the card. The figures are about a half inch at the base. The rectangle is one-half that height and the triangle is the altitude of the square. This card is illustrated in Professor Whipple's "Manual of Mental and Physical Tests."

Examiner: "Do you see this piece of wood? (holding the black cube before the subject). Point to a figure on this card that looks like it. (This is to prepare the subject for the second part of the test.) (After having

obtained the recognition.) Point to all the squares with this pencil. Go line by line, as fast as you can, and do not miss any."

This test was passed by over 80 per cent. of the normal children of 5-year mentality and 77 per cent. of the feeble-minded subjects of the same mental level, while in each group at the 4-year level less than 40 per cent. succeeded. This is a very good 5-year-old test. Credit was always given if the subject held the idea to the end of the test—none of those credited skipped more than three squares.

The reaction to the test requires for success perception of form "in a way to establish the identity of a plane figure with a solid," ability to follow directions, co-ordination of hand and eye muscles, and duration of attention. Some subjects showed foresight and so lessened their time reaction to the test by reversing the direction in which they pointed out the squares at the end of each line.

The average time that it took to do this test was worked out for the different mental levels. But these figures do not seem to be of value when so massed—the limits of variability show so much overlapping. For the time element to be considered at all, the tests would have to be given under decidedly laboratory conditions—each subject having been previously tested for eye defects, disturbing sounds eliminated, etc. Even then it is probable that to be of value the average time of several performances would have to be taken, since when this test was repeated with the same subject after intervals of several days, great individual variability in time reaction was shown.

Thruout the whole series the examiner felt that the time reactions to the different tests would be of value only when accompanied by the examiner's observation of each subject and of his whole reaction to the test, and then would be largely valuable in showing the type of individual rather than a degree of intelligence. Is he quick with good co-ordination or slow motioned with equally good co-ordination but over conscientious—fearful of making a mistake, etc.? Altho time records were kept, the data do not seem of enough value to publish.

TEST 5.

Material—A set of 12 wooden cubes of the same color (natural wood), gradually increasing in size from 1.5 to 8cm.

Examiner: Here are blocks of wood just like those you saw on the card.

(a) Look carefully and tell me how many there are.

When the child had responded to this, the examiner asked:

(b) Which one of them is the largest?

And last:

(c) Which one is farthest from you?

The twelve cubes were scattered on the table in no definite arrangement, except that the largest cube was in about the middle of the group on the left-hand side, another of the large cubes was in the same position on the right, and the cube farthest from the subject was the fourth largest and was decidedly the farthest from the subject and directly in front of him. Care must be taken that the smaller cubes are plainly in view from where the subject sits—not hidden by the larger blocks.

It was noticed early in the testing that the lower grade feeble-minded children tended to select the largest block, no matter what question was asked, or very often selected the large block near their favored hand. By placing the blocks as above and repeating the question with these younger children, such cases could be checked. The results for 5b and 5c would be quite different were these precautions not taken.

In a note explaining his tests Professor De Sanctis writes, "It should be understood that the experimenter may always substitute for the words suggested other words better adapted to the age and the degrees of instruction of the subject. This was the procedure of Professor M. Montessori, and more recently of A. Ieronutti (a pupil of De Sanctis).

After the subject had failed in the last two questions, having been given three trials, the form of the questions was changed to, "Which is the *biggest?*" and "Which is the farthest *away* from you?" "These changes were suggested after testing a few of the lower grade feeble-minded children. In responding some of them would say, "This is the biggest," or "This is the far away one," after hesitating over the original questions.

It is a question how much this is a test of ability to discriminate size and distance, as is claimed, since language is such a factor. To illustrate, after a 4-year-old child had decidedly failed when asked to show the biggest block, the mother, who was observing the test, said, "Why, you know. Which is the *great, great* big one?" The child pointed to the right block immediately. There was no doubt about his ability to discriminate size when the question was put that way.

The following table gives the number of children tested, classified by mental age, and the percentage of successes for the different parts of this test:

NORMAL CHILDREN

Mental age	No. tested	Enumerating cubes	Which is the largest?	Which is the biggest?*	Which is the farthest from you?	Which is the farthest away from you?*
		%	%	%	%	%
3	7	0	0	0	0	0
4	8	0	25	38	12	25
5	24	29	46	96	29	58
6	36	75	81	97	50	74
7	43	98	93	100	74	98
8	37	100	100	100	81	100
9	27	100	100	100	96	100
10	21	100	100	100	100	100
11	4	100	100	100	100	100

FEEBLE-MINDED CHILDREN

Mental age	No. tested	Enumerating cubes	Which is the largest?	Which is the biggest?*	Which is the farthest from you?	Which is the farthest away from you?*
		%	%	%	%	%
2 & 3	19	0	0	0	0	0
4	13	0	8	46	23	31
5	17	29	35	82	24	75
6	23	52	44	96	52	83
7	25	92	92	96	56	88
8	20	90	100	100	80	95
9	18	100	100	100	95	100
10	11	100	100	...	100	100

TEST 6a.

Examiner: "Are large things heavier or lighter than small things?"

In the case of the normal children of 6-year mentality, 72 per cent. succeeded in this test; of the feeble-minded subjects of the same mental age only 48 per cent. passed the test. Only 2 of the 68 public school children of the 7-year mental level failed the test; these were both feeble-minded cases.

*Question only asked after the main question had been missed. The column includes those who succeeded with the main question and the substituted question.

The character of the failures for test 6a was no response, repetition of last word, "lighter," and "I don't know." When the correct response was given in just one word, "Heavier," the examiner always put a test question, "What do you mean?" This was to see that the subject was not merely repeating. The reply was usually, "Large things are heavier."

From examining the responses it was found that the children of the higher mental ages tended to *qualify their statements.* They would say, "Well, that *depends* upon the material" (the stuff or the thing). "Large things are *usually* heavier," or use such words as "many," "some," "sometimes," "often," or give a conditional sentence using "if" or "when." The question suggests that large things are either heavier or lighter than small things. They tended to resist this suggestion.

Account was made of all those who had so qualified their response to this first question.

	NORMAL CASES			FEEBLE-MINDED CASES		
Mentality	No. tested	Qualified answers	% Qualified	No. tested	Qualified answers	% Qualified
11 yrs.	4	3	75	5	4	80
10 yrs.	21	5	24	10	2	20
9 yrs.	27	4	15	18	2	11
8 yrs.	37	3	8	20	3	15
7 yrs.	43	2	5	25	1	4
6 yrs.	37	0	0	23	0	0

Because the children of 11-year mentality so generally considered before replying and those of the lower years did not, it was thought well to carry the test further. Public school children in 2 sixth grades, 3 fifth grades and 1 fourth grade were asked this question. At-age children in these grades are supposed to average 12, 11 and 10 years respectively. The answers were given in writing. The question was presented to the children by examiner in this way, "Write what you would reply to a person who asked you, 'Are large things heavier or lighter than small things?'" Over-age cases were not discarded. All replies were considered.

	No. tested	Qualified answers	% Qualified answers
Sixth Grades	72	58	81
Fifth Grades	111	76	68
Fourth Grades.....	33	9	27

Although from the conditions under which this was given (group test, writing, etc.) it is not quite comparable to the rest of the data, it is yet an interesting side light.

Twenty normal adults were also asked question 6a; they all gave qualifying answers immediately. After the response each was asked to give the picture that had been in his mind as he had answered. One said that he had not been conscious of a picture. All of the others had had concrete images but had not woven them into their responses. These pictures were just such as had been given by the older children in response to the next question, 6b.

From this it would seem that although children of 7-year mentality succeed in the test, yet it is not until they are of 11- or 12-year mentality that they stop to consider and give a qualified answer.

In the discussion of this first question Professor De Sanctis only considers it as a preliminary one and only uses it to prepare the subject for the main question, which follows, 6b. Dr. Decroly uses both 6a and 6b as sub-questions and only asks them if a subject has failed in a question which he puts first, "Are the largest objects necessarily the heaviest?" From the wording this asks the subject to consider. This was the original form used by De Sanctis.

If note is made of the qualified answers, it would seem that the question is quite valuable in itself and might be used among the tests for the upper years.

TEST 6b.

"How does it happen that sometimes small things are heavier than large things?"

The responses to this question were very interesting. When the reply given was not clear the examiner asked, "What do you mean?" No other variation was made. It was found that without this question many answers could not be interpreted fairly. For example, one child replied, "They make it that way," which might have been credited as a failure, but after being asked what he meant, he added, "Why, they cut out a hole, put more wood in it, and then lock it up," which is about on the level of the replies (often given) that "the small things have something inside."

The children of 3, 4 and 5 year mentality either did not reply, said they did not know, or repeated part of the question, very often the last words, and when the question was repeated they often changed their response. For example, "Large things" then "Small things." Of 41 children of mentality of 5 years, normal and feeble-minded, only 2 replied in a way that might be credited, "They put too much sugar or coffee in it," "They put a little too much in little things than they do in larger things." These were both cases of normal children.

Of 36 normal children of 6-year mentality 7 gave responses that could be credited. Only one child mentioned a metal, iron. Characteristic answers:

"Cause they make heavier things inside—little stones or something."

"The big thing might be like a bundle of papers and the little thing like a rock."

"They put more wood *inside.*"

Among the failures of this year were quite a few silly answers: "Because they are round," "Cause they go too fast," "Cause there are so many branches," "Cause your arm hasn't got no strength to it."

A few six- and seven-year-old children seemed to think that large things meant tall things. One said, "The small things are fatter. Our little baby weighs more than me." Several said that small things were thicker, but by the movements of their hands one could see that they meant wider. As one 7-year-old child expressed it, "Because they are square like this (drawing the hands apart) and the others are long like this (holding hand high above the table) and they carry more up in the air." Quite a few children of the higher mental development gave as an answer that the smaller object was thicker, but when asked, "What do you mean?" they explain that the larger object had thin sides and the small object had thick sides.

Characteristic of the replies of 9-, 10- and 11-year-old mentality were the statements that the smaller object might be made of different material, that it might be solid, have thicker sides, or have something in it to make it heavy. When illustrations were given, they mentioned small objects of dense material, usually a metal, such as iron. Out of 52 normal children of these mental ages only 2 gave responses differing from the above in that they gave illustrations of more familiar objects.

Of the 32 children of 8-year mentality who succeeded in the test (37 tested), 10 gave very concrete illustrations of familiar objects—"nickel heavier than paper dollar," "small heavy ball and light football," "it might be rotten in the middle," "small dish with meat on it, large dish empty," "small wagon full of chairs, large wagon empty," "small bag of clothes, large bag not full," "something with 'marble' in it or 'blocks' or 'watermelons' or 'balls' or 'pennies.'" One child said, "Maybe they have more packages in it. Maybe a lot of things in the little bundle." Although many children of 7 and 8 years mental age gave just such responses as were described of the higher years, yet among the former were a greater proportion of replies of a more concrete character.

TEST 6c.

Examiner: "Do distant things looker smaller or larger than near things?"

In this test the words "far away" were substituted for "distant" when the meaning of the latter was not understood. When the subject responded correctly with but one word, "Smaller," the examiner always asked, "Which things look smaller?" In this way cases of pure repetition were detected.

Of the normal 6-year-old children 61 per cent. passed this test, while 98 per cent. of the children of 7 years succeeded. In the feeble-minded group it was passed by only 60 per cent. of the 7-year-old children; 85 per cent. of the 8-year-old children succeeded.

TEST 6d.

Examiner: "Do they only appear smaller or are they really smaller?"

The word "really" here inserted was suggested by De Sanctis and appears in his description of the tests published in L'Année Psychologique, 1906.

After the subject had succeeded in answering the last question, "Do they only appear smaller or are they really smaller?" another question, "How do you know?" was asked to see if the success was due to chance and on what experience the subject was basing his reply. "Look" was substituted for "appear" where the subject did not know the meaning of the latter.

No child under a mental age of 6 years succeeded in passing this test. Out of 36 normal 6-year-old children examined, 16 responded correctly. The replies to the test question were of such a nature as to leave no doubt that these children understood.

"They ain't really little because they look big when you get close."

"Once we were on a high place and looked down. It was a tiny trolley car, but when we got down it was a great big one."

"Because houses can't be small, and they look small far away. Dog houses can be small."

"I saw my father once in a wagon, way off, and he looked little."

De Sanctis says that "This question will show whether the subject is aware of optical illusions." There were a number of children who after insisting that the distant object was "really smaller" and being asked, "How do you know?" replied, "Because when they are far away they are awful little. When you get to them they are big." In one of these cases the examiner asked, "Then are the far away things really smaller?" and the normal 7-year-old subject replied, "Yes, but *not when you get up to them.*" His idea evidently was that they *really looked* smaller—again a language difficulty rather than a question of not being aware of the facts.

Eighty-three per cent. of the normal 7-year-old children passed this test, but in the case of the feeble-minded it was not until we reached the 9-year-old group that more than three-fourths of the cases passed (94 per cent.).

Great care was taken in asking these four abstract question of Test 6 that they be given slowly and with expression and that the important words be spoken with equal emphasis. Answers were taken verbatim. The order of the adjectives in 6a and 6c and that of the verbs in 6c must not be reversed. The experimenter is cautioned not to have any blocks exposed on the table during the test.

The following tables give a summary of our results:

TABLE I.

RESULTS WITH NORMAL CHILDREN.

Arranged According to Mental Age.

Mental age	No. of Cases	De Sanctis Tests—Per Cent. Passed											Ave. Chron. age
		1	2	3	4	5a	5b	5c	6a	6b	6c	6d	
3	7	100	29	29	0	0	0	0	0	0	0	0	4.3
4	8	100	88	88	38	0	38	25	0	0	0	0	4.3
5	24	100	96	100	83	29	96	58	29	8	12	0	5.4
6	36	100	100	100	100	75	97	74	72	19	61	44	6.2
7	43	100	100	100	100	98	100	98	100	53	98	83	7.5
8	37	100	100	100	100	100	100	100	100	86	100	95	8.8
9	27	100	100	100	100	100	100	100	100	90	100	92	9.9
10	21	100	100	100	100	100	100	100	100	100	100	100	10.3
11	4	100	100	100	100	100	100	100	100	100	100	100	11.4
Total,	207												

TABLE II.

RESULTS WITH FEEBLE-MINDED SUBJECTS.

Mental age	No. of Cases	De Sanctis Tests—Per Cent. Passed 1	2	3	4	5a	5b	5c	6a	6b	6c	6d	Ave. Chron. age
2	13	77	15	31	0	0	0	0	0	0	0	0	8.8
3	6	100	17	33	0	0	0	0	0	0	0	0	11.9
4	13	100	69	77	38	0	46	31	0	0	0	0	13.4
5	17	100	82	94	76	29	82	75	12	0	0	0	13.1
6	23	100	100	100	91	52	96	83	48	0	13	4	15.4
7	25	100	100	100	100	92	96	88	92	32	60	32	13.8
8	20	100	100	100	100	90	100	95	100	60	85	60	16.3
9	18	100	100	100	100	100	100	100	100	78	100	94	21.9
10	10	100	100	100	100	100	100	100	100	91	100	100	26.1
11	5	100	100	100	100	100	100	100	100	100	100	100	21.1
Total,	150												

TABLE III.

RESULTS WITH NORMAL CHILDREN.

Arranged According to Chron. Age.

Chron. age	No. of Cases	De Sanctis Tests—Per Cent. Passed 1	2	3	4	5a	5b	5c	6a	6b	6c	6d
3	3	100	0	0	0	0	0	0	0	0	0	0
4	12	100	92	92	33	8	42	42	0	0	0	0
5	33	100	91	97	88	52	91	54	46	15	27	10
6	32	100	100	100	97	72	97	84	81	34	66	56
7	33		100	100	100	91	100	94	91	49	97	82
8	24				100	100	100	100	100	67	100	96
9	36				100	100	100	100	100	92	100	94
10	21				100	100	100	100	100	91	100	91
11	9				100	100	100	100	100	100	100	100
12 and 13	4				100	100	100	100	100	100	100	100
Total,	207											

Several points worthy of note are manifest in these tables.

First. Each test without exception shows decreasing difficulty as age increases, that is, the older the children the larger percentage pass the test.

Second. De Sanctis' arrangement is not quite in order of difficulty. For example, 5a (how many) requires an older mind than 5b or 5c (largest or farthest); and 6b (how does it happen that sometimes small things are heavier than large things), ranks as the hardest question in the list.

Third. Normal children do better than defectives of the same mental age.

It is possible, since the children at the Training School are tested each year, that they have learned from their experience with the tests and are rated a little too high, so that when given a new task they are at a disadvantage as compared with the children who have not been repeatedly tested.

Professor Pintner in an article in the *Psychological Clinic,* July, 1915, claims that "The Binet Scale contains some tests which depend largely upon early experience and hence the older the child tested the more liberal is the estimation of his mentality as computed by the present Binet Scale." Thinking that this might help explain the difference in the two groups, the feeble-minded over sixteen years of age were compared with those under that age in all the mental levels. If these older cases are rated too liberally by the Binet Scale the average number of the De Sanctis' tests that they passed ought to be less than for the corresponding group of younger subjects. This division did raise the average number of tests in five of the years for the under sixteen year group, but only to a very slight degree and not enough to account for the difference between the two groups.

That subtle difference between the normal and the defective Dr. Goddard discusses in his book, "Feeble-mindedness," and reminds the reader that "It must not be forgotten that the defective child lacks energy. He is consequently not active, inquisitive, interested like the normal * * * in spite of these differences to say that he is like a normal child of the same mental age is to describe him much more accurately than can be done in any other way." This is a point that needs explanation but evidently must await further data.

Fourth. Most important of all is the evidence of the high value of these tests as tests of mentality. A glance at the tables and curves shows that the tests are as nearly ideal as any yet proposed. Altho the number of children tested for each chronological age is small and a more extended study would be necessary for a decided standardization—yet the sudden rise in ability to do the test with increasing age makes it easy to suggest the standard.

The following table shows the mental age indicated by each test.

Test No. 1 a 2-year test
" " 2 " 4- or 5-year test
" " 3 " 4-year test
" " 4 " 5- " "
" " 5a " 7- " "
" " 5b " 5- " "
" " 5c " 6- " "
" " 6a " 6- or 7-year test
" " 6b " 9-year test
" " 6c " 7- or 8-year test
" " 6d " 7- or 8-year test

This table is interesting when one remembers the claims of the author, "That intellectual defect of a very high degree is established when the subject cannot pass the two simplest tests; of a moderate degree if the subject cannot go beyond the fourth or having passed the fourth, does the fifth with much difficulty and with many errors; of a slight degree if the subject succeeds in five tests but finds the sixth difficult."

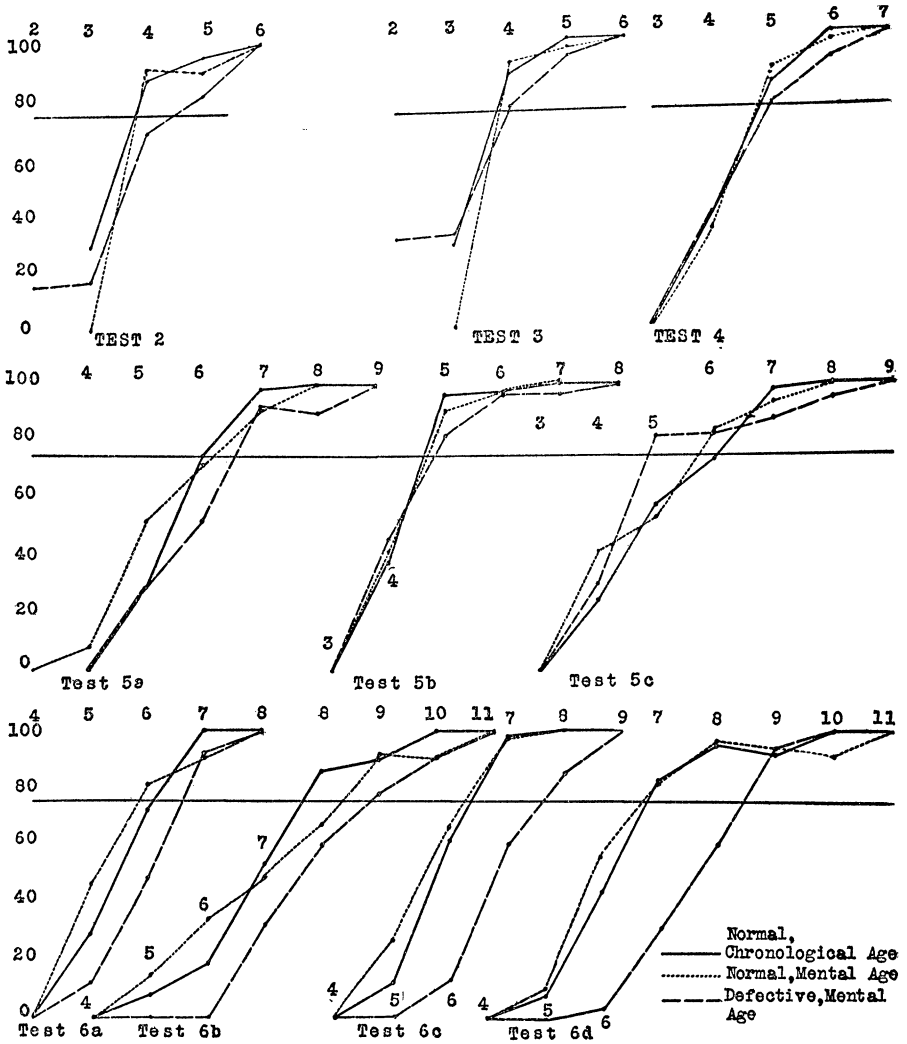
Dr. De Sanctis considers that ability to pass all six tests indicates normal intelligence. Our results are as follows:

	NORMAL			FEEBLE-MINDED				
Mental age	No. of Cases	No. that passed all tests	% that passed all tests	No. of cases	No. that passed all tests	% that passed all tests	No. over 16 yrs. that passed all tests	% over 16 yrs. that passed all tests
6	36	6	16	23	0	0	6	0
7	43	21	50	25	2	8	6	16
8	37	30	81	20	9	45	7	57
9	27	23	85	18	13	72	14	64
10	21	21	100	10	9	90	8	88
11	4	4	100	5	5	100	5	100

No defective below 7-year mentality passes all the tests, while in the normal group none below 6-year mentality pass all the tests. It would seem that by "defective" De Sanctis meant about what we include under "imbecile," since morons as a group are successful to a high degree in passing all the tests (of 53 morons 36 or 68 per cent. passed all).

It is particularly interesting to notice in the normal group that of 79 children tested of 6 and 7 year mentality only 34 per cent. passed all the tests, while of 64 children of 8 and 9 year mentality 83 per cent. passed all the tests. The rise at the 8 year level is very marked.

The argument is strengthened by noting Dr. Decroly's comment after working with these tests—"The series certainly gives excellent results with children and *'adolescent faibles'* from 7 to 16 years. One can by the series,



CURVES SHOWING THE DEVELOPMENT OF ABILITY TO DO THE DIFFERENT TESTS

Ordinates are percents passing: abscissas are years. Horizontal line shows the 75% limit.

less easily than by the Binet tests, differentiate the different degrees of intellectual defect. And it seems to us many times imperfect when one goes to distinguish the high grade feeble-minded from the normal state, if you apply it to subjects who have gotten perceptibly beyond 7 years." (La Mesure de l'intelligence chez les enfants.)

Dr. De Sanctis states that for feeble-minded subjects beyond 16 years of age even test 6 is too easy because of the extended experience of the subject. To determine this point the average number of tests passed by the defective children under 16 years of age was compared with those passed at the corresponding levels by the group 16 years old and over. There seemed to be no marked advantage in favor of the older group, although the numbers were too small from which to judge.

Conclusion. It would seem from the foregoing results that the De Sanctis tests not only indicate the grades of defect (idiot, low imbecile, and high imbecile) as De Sanctis claimed, but that they mark grades of development of normal mind. With the higher questions some care must be exercised to avoid the language difficulty, but when this is done they may be used with much satisfaction to supplement the Binet in doubtful cases, or for use with any other scale. As a series in itself it is too verbal.

PUBLIC SCHOOL CHILDREN EXCLUDED FROM THE REPORT

Chron. age	Mental age	Grade in school	Response to De Sanctis tests
14	9	4th	Failed in one test—6b.
13	8	3rd	Succeeded in all the tests.
13	8	3rd	Failed in one test—6b.
9	6	2nd	Failed in one test—6b.
7	3	1st	Failed in all tests except first

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